

AMENDMENTS TO THE CLAIMS

Claims 1-8 (canceled)

Claim 9. (currently amended): An imaging system, comprising:

an active pixel image sensor array disposed on a substrate, said array comprising a plurality of pixels;

at least one analog to digital converter for sampling and converting analog information from pixels in said array to digital values; and

a plurality of digital memory arrays disposed on said substrate for storing and accumulating said digital values;

wherein each pixel in said active pixel image sensor array is sampled multiple times during an integration period and each sampled value is stored in ~~at least~~ one of said digital memory arrays.

Claim 10. (previously presented): The imaging system of claim 9, wherein said active pixel image sensor array is a CMOS image sensor.

Claim 11. (previously presented): The imaging system of claim 9, wherein said at least one analog to digital converter is an oversampling converter.

Claim 12. (previously presented): The imaging system of claim 9, further comprising an analog signal processor including column analog double sampling circuitry.

Claim 13. (previously presented): The imaging system of claim 12, wherein said column analog double sampling circuitry samples both a signal and a reference for decreasing pixel fixed pattern noise.

Claim 14. (previously presented): The imaging system of claim 12, wherein said analog signal processor further comprises at least one preamplifier with adjustable gain.

Claim 15. (previously presented): The imaging system of claim 9, wherein said at least one analog to digital converter comprises a column analog to digital converter for each pixel column of said active pixel image sensor array.

Claim 16. (previously presented): The imaging system of claim 9, further comprising at least one digital signal processor coupled between said at least one analog to digital converter and said one of said plurality of digital memory arrays.

Claim 17. (previously presented): The imaging system of claim 16, wherein stored multiple sampled digital values for each pixel stored in said one of said plurality of

digital memory arrays are used to provide an integrated output signal for said each pixel.

Claim 18. (previously presented): A method of acquiring an image, comprising:

using an active pixel image sensor array including a plurality of pixels to image a scene and to produce analog image information said active pixel image sensor array being disposed on a semiconductor substrate;

sampling and converting said analog image information for a first pixel of said active pixel image sensor array plurality of times during a desired integration period to produce a first plurality of digital values;

storing said first plurality of digital values in a first digital memory, said first digital memory being disposed on said semiconductor substrate;

sampling and converting said analog image information for a second pixel of said active pixel image sensor array a plurality of times during a desired integration period to produce a second plurality of digital values; and

storing said second plurality of digital values in a second digital memory, said second digital memory being disposed on said semiconductor substrate.

Claim 19. (previously presented): The method of claim 18, wherein said active pixel image sensor array is a CMOS image sensor.

Claim 20. (previously presented): The method of claim 18, further comprising using the stored digital values for each pixel to produce a respective integrated pixel output signal for said integration period.

Claim 21. (currently amended): A semiconductor chip, comprising:

a substrate comprising:

an active pixel image sensor array comprising a plurality of pixels;

at least one analog to digital converter for sampling and converting analog information from pixels in said array to digital values; and

a plurality of digital memory arrays for storing and accumulating said digital values;

wherein each pixel in said active pixel image sensor array is sampled multiple times during an integration period and each sampled value is stored in ~~at least~~ one of said digital memory arrays.

Claim 22. (previously presented): An imaging system as defined in claim 9 wherein said plurality of digital memory arrays comprises two digital memory arrays.

Claim 23. (previously presented): An imaging system as defined in claim 22 wherein said two digital memory arrays are disposed on opposite sides of said active pixel image sensor array.

Claim 24. (previously presented): A method of acquiring an image as defined in claim 18 further comprising:

integrating said first and second pluralities of digital values to produce a first integrated value and a second integrated value respectively.

Claim 25. (previously presented): A method of acquiring an image as defined in claim 18 wherein said first and second digital memories are disposed on opposite sides of said active pixel image sensor array.

Claim 26. (previously presented): A semiconductor chip as defined in claim 21 wherein said substrate further comprises:

an analog signal processor coupled to at least one pixel of said plurality of pixels of said active pixel image sensor array; and

a digital signal processor coupled to said analog signal processor and coupled to at least one array of said plurality of digital memory arrays.